Space Weather Forecast

Issued on Wednesday, 14 February 2024 at 13:26 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance G1 Minor Geomagnetic Storms Day 1 (14 Feb) due to possible coronal mass ejection arrival. Isolated Moderate flares likely, and slight chance Strong flares. Minor Solar Radiation Storm expected to continue to ease.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate activity in the last 24 hours with two Moderate flares recorded. There are eight sunspot regions on the visible disc, with the active region in the southwest persisting as the largest and most complex region, having seen some growth of positive spots around the main leader, and maintaining a complex magnetic configuration. A further region, potentially significant, is expected on the northeast limb due to recent observed flare activity.
No Earth-directed coronal mass ejections (CMEs) were observed in available imagery.

Solar Wind / Geomagnetic Activity: Solar winds were generally background to slight-elevated 350-450km/s. Interplanetary magnetic field (IMF) Bt, was at weak levels. The north-south directed field, Bz, also varying weakly. Geomagnetic activity was mostly Quiet to Unsettled (Kp1-3), but with one Active (Kp4) interval 13/1500-1800 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) has been above the Minor Radiation Storm level throughout but has generally followed a sustained declining trend. Values showed another slight rise from around 14/0800UTC, likely in response to recent large far-side activity, but now looking to be continuing a slow decline.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is expected with the likelihood of further isolated Moderate flares, and a slight chance of Strong flares. These most likely from the large region in the southwest.

Solar Wind / Geomagnetic Activity: There is one CME still thought to have the potential to influence the near Earth environment, this associated with the M9 flare on 10 Feb. This was originally expected on 13 Feb, but with a late arrival still possible into day 1 (14 Feb) though any potential impacts from this feature this looking increasingly limited as time goes on. Solar winds are currently slightly elevated, with recent CME influence has now perhaps receded. Any CME arrival during day 1 (14 Feb) may lead to more disturbed winds but in the increasingly likely absence of significant enhancement winds expected to persist at around 400-450 km/s before slowly easing to background through the period. A chance of Active to G1 Minor Storm intervals day 1 (14 Feb), otherwise mainly Quiet activity expected, with a decreasing chance of Unsettled intervals.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is at S1 Minor Radiation Storm levels, but expected to continue slowly declining through the period, likely falling below the S1 level into day 2 (15 Feb), but continuing above background

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levels throughout. Further enhancements are possible from any significant flaring however, particularly from the large sunspot in the southwest disc.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	30	1	1	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	70	60
Very Active	R3 to R5 X	No	15	15	15	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	100	30	20	20
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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